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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,107	10/31/2003	Walter Baechtiger	BAE1.001	5452

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EXAMINER	
STERRETT, JONATHAN G	

ART UNIT	PAPER NUMBER
3623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/699,107	BAECHTIGER, WALTER
	Examiner	Art Unit
	JONATHAN G. STERRETT	3623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10-31-2003*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. Currently **Claims 1-24** are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 18, 19, 23 and 24** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding **Claims 18 and 19**, these claims cite a “stop criterion” in **Claim 15**. There is insufficient antecedent basis for this limitation because **Claim 15** does not recite a “stop criterion”. (Similarly **Claims 23 and 24** refer to a "stop criterion" in **Claim 20** - there is no "stop criterion" recited in **Claim 20**.)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 USC. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1-24** are rejected under 35 USC. 103(a) as being unpatentable over **Shmoys**, et. Al, “Approximation algorithms for facility location problems”, 1997,

Proceedings of the twenty-ninth annual ACM symposium on Theory of computing, El Paso, Texas, United States,Pages: 265 – 274(1-21) (hereinafter **Shmoys**)

(This article was retrieved from http://www.cs.uu.nl/research/techreps/repo/CS-1997/1997-39.pdf)

The above reference denotes various algorithms for use in solving facility location problems. Shmoys provided various algorithms for helping to minimize the cost associated with location of facilities to serve or provide goods to users. Although the specific steps of processing data regarding users and service locations is different in the various algorithms of Shmoys, the algorithms themselves are comprised of a series of steps that provided a predictable result and would have been obvious to try by one of ordinary skill in the art. These steps are designed to provide an algorithm, i.e. a series of steps, in order to efficiently assign users to locations without solving the complex underlying mathematical equations.

While its not clear and readily apparent that all the functionality were provided as a single particular algorithm, this reference clearly show that Shmoys, as a whole, taught the various limitations claimed. Therefore the Examiner submits that it would have been obvious to one of ordinary skill in the art of algorithms and mathematics to offer any permutation of these algorithms to help optimize the assigning of facilities to locations, thereby minimizing operational costs and improving operations performance. Therefore it would have been obvious to combine the following limitations separately as taught by the different algorithms of Shmoys as laid out below, because they would

have been obvious to try and would have provided a predictable result to one of ordinary skill in the art.

Regarding **Claim 1**, Shmoys teaches:

A method for placing branch locations comprising the steps of

(a) identifying at least one service provider branch location;

Page 1 para 1, facility locations identified as part of problem definition

(b) identifying at least one service receiver;

Page 1 para 1, the service receivers served by the locations are each client j

(c) identifying a measure of service receiver value;

Page 2 para 1, the measure of service receiver value being optimized is lowest cost (i.e travel distance).

(d) calculating the value of each of said service receivers based on said measure of service receiver value;

Page 2 para 1, the algorithm optimizes the value (by minimizing cost) of the service receivers based on the distance for all the service receivers.

(e) determining which of said service provider branch locations is the closest service provider branch location for each of said service receivers;

page 2 para 4, the algorithmic approach minimizes cost of travel ,i.e. finds the nearest location for each of the clients (i.e. the service receivers).

Shmoy further teaches an algorithm that that is a min-sum approach (see page 2 bottom para), i.e. the algorithm converges to a minimum sum (i.e. the stop criterion).

Shmoys teaches approaches that are primarily deterministic in his various lemmas, however Shmoys does not teach using a probabilistic approach explicitly as per:

(f) determining a probability that each of said service receivers will utilize said closest service provider branch location.

However Shmoy notes on page 2 para 2 that the analysis of assignment of service receivers to locations can be made using probabilistic analysis – this suggests determining a probability that a receiver will use the closest branch location.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shmoys to include applying a probabilistic analysis, because Shmoys teaches that using such an approach is well known in the art and this would have thus provided a predictable result in optimizing the location of service provider facilities.

Regarding **Claim 2**, Shmoys teaches:

The method of claim 1 wherein said closest service provider branch location is determined by travel time between said service receiver and said service provider branch location.

Page 2 last para - the use of distance (i.e. travel time) is used to determine optimum location.

Regarding **Claim 3**, Shmoys teaches:

The method of claim 1 wherein said step of identifying a closest service provider branch location from said service provider branch locations for each of said service receivers includes the steps of: determining a travel time between each of said service receivers and one or more of said service provider branch locations; and

Page 2 last para, the algorithm determines distance (i.e. travel time) between a location and a service receiver.

for each of said service receivers, defining the service provider branch location with the shortest travel time as the closest service provider branch location for said service receiver.

Page 2 last para, the algorithm seeks to minimize the maximum distance a person has to travel (i.e. shortest travel time).

Regarding **Claim 4**, Shmoys teaches:

The method of claim 3 including the further step of determining a value for each of said service provider branch locations.

Page 2 last para, since the approach is a cost minimization problem, it determines a value for each of the branch locations as a step towards finding the total minimum cost for all the locations.

Regarding **Claim 5**, Shmoys teaches:

The method of claim 4 wherein said step of determining a value for each of said service provider branch locations includes said step of summing for each service receiver for which said service provider branch location is said closest service provider branch location the products of (i) said value of said closest service receiver and (ii) said probability that said closest service receiver will utilize said service provider branch location.

Page 2 last para-Page 3 first para, a cost minimization algorithm sums for all the facilities the probabilities that the aggregate demand from the clients (i.e. the service receivers) will be serviced at various locations (i.e. splitting demand among locations is assigning a probability that a portion of that demand is serviced by that location).

Regarding **Claim 6**, Shmoys teaches:

The method of claim 5 including the further step of determining the value of the service provider branch network.

Page 2 last para, since an aggregate demand is being serviced, then this requires determining the total value of demand that is serviced by the network locations.

Regarding **Claim 7**, Shmoys teaches:

The method of claim 6 wherein said step of determining the value of the service provider branch network includes the step of determining network reach.

Page 3 under section 2, the definition of ‘n' network facilities defines network reach.

Regarding **Claim 8**, Shmoys teaches:

The method of claim 6 wherein said step of determining the value of the service provider branch network includes the step of determining total network travel time.

Page 2 last para, since the problem is a minimization problem – it determines the total value of the system in order to minimize the total cost (i.e. travel time).

Claims 9-13, 15 recite similar limitations addressed by the rejection of **Claims 1-8** above, and are therefore rejected under the same rationale.

Regarding **Claim 14**, Shmoys teaches:

The method of claim 13 wherein said step of applying a genetic algorithm to create a population of solutions includes the steps of:

(a) discarding a number of solutions determined to be least valuable;

(b) creating new, cross-over solutions from said solutions which have not been discarded; and

(c) mutating a number of service provider locations within said new, cross-over solutions.

Page 4 para 1, the development of a fractional solution is a repeated step in the algorithm (in previous steps less than optimal solutions are discarded) which is a new cross-over solution based on the previous solutions. The x sub i-j (where 'i' is the service location) is mutated (i.e. changed from location) to identify an optimal solution.

Regarding **Claim 16**, Shmoys teaches:

The method of claim 15 wherein said fitness parameter is maximized.

Page 2 last para – Shmoys advocates using a min-max approach (i.e. a fitness parameter to the algorithm is maximized).

Regarding **Claim 17**, Shmoys teaches:

The method of claim 15 wherein said fitness parameter is minimized.

Page 2 last para – Shmoys advocates using a min-max approach (i.e. another fitness parameter to the algorithm is minimized).

Regarding **Claim 18**, Shmoys teaches an iterized algorithm for optimization. Shmoy does not teach a stop criterion that is a number of iterations.

However Official Notice is taken that it is old and well known in the art to stop an algorithm after a number of iterations. This is known to be done to prevent divergence of the results of the algorithm or to keep the algorithm from going into an 'infinite loop' situation when the algorithm is programmed in a computer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shmoys regarding stopping the algorithm after a number of iterations because it would provide a predictable result through providing an output from the algorithm after a number of iterations. It is recognized in the art that the iterations used to define an algorithm's output are not infinite in number (i.e. on page 5 under Proof, the reference to the algorithm ‘iteratively converts this solution into a 3g-close integer solution implies there is a finite number of iterations).

Regarding **Claim 19**, Shmoys teaches:

The method of claim 15 wherein said stop criterion is a number of iterations of said genetic algorithm wherein said fitness parameter fails to be further optimized.

Page 2 para 3, Shmoys references an algorithm optimization as being ‘asymptotically tight’ – this suggests a solution approaching an asymptote such that further iterations fail to result in further increases in optimization of the parameter sought to be optimized.

Regarding **Claim 20**, Shmoys teaches the limitations in claim 1 above. Shmoys further teaches the use of a probability threshold (page 2 para 1 under section 2, the ‘threshold' is assigning costs – note that x sub ij is less than or equal to y sub 'i', defining a threshold of assignment of service receivers to locations.

Claims 21-24 recite similar limitations addressed by the rejection of **Claims 16-19** above, and are therefore rejected under the same rationale.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 20030099014 by Egner discloses a method for optimized design of an optical network.

US 20020188489 by Cheng discloses a method for optimizing office worker productivity.

US 5546542 by Cosares discloses a method for routing demands in a communication network.

US 5343388 by Wedelin discloses a method for optimally allocating resources.

US 5504887 by Malhotra discloses a method for clustering objects based on workload.

US 5940816 by Fuhrer discloses a method for multi-objective decision making

US 6092065 by Floratos discloses a method for clustering and classifying patterns in 1 dimensional event streams.

Mahdian, et al, “A Greedy Facility Location Algorithm Analyzed Using Dual Fitting”, Lecture Notes In Computer Science; Vol. 2129, 2001, Proceedings of the 4th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems, ISBN:3-540-42470-9.

AB Hadj-Alouane, JC Bean; “A Genetic Algorithm for the Multiple-Choice Integer Program”- Operations Research, 1997 – JSTOR.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan G. Sterrett whose telephone number is 571-272-6881. The examiner can normally be reached on 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Tariq Hafiz can be reached on 571-272-6729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JGS 2-2-2008
/Jonathan G. Sterrett/
Primary Examiner, Art Unit 3623